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FAMILY LYCEUM.

JOSIAH HOLBROOK, EDITOR.

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THE ANCIENTS.

From Good's Gallery of Nature and Art.

ARCHIMEDES.

ARCHIMEDES alone would afford sufficient matter for a volume, in giving a detail of the marvellous discoveries of a genius so profound and fertile in invention. Some of his discoveries appeared so much above the reach of men, that many of the learned of our days found it more easy to call them in doubt, than even to imagine the means whereby he had acquired them. We are going to produce proofs of the fecundity of genius belonging to this celebrated man; and in how high a degree of excellence he possessed this inventive faculty, may easily be judged of by the greatness of those events which were effected by it. Leibnitz, who was one of the greatest mathematicians of his age, did justice to the genius of Archimedes when he said, that if we were better acquainted with the admirable productions of that great man, we would throw away much less of our applause on the discoveries of eminent moderns.

Wallis, also, in speaking of Archimedes, calls him a man of admirable sagacity, who laid the foundation of almost all those inventions, which our age glories in having brought to perfection. In reality, what a glorious light hath he diffused over the mathematics, in his attempt to square the circle; and in discovering the square of the parabola, the properties of spiral lines, the proportion of the sphere to the cylinder, and the true principles of statics and hydrostatics? What a proof of his sagacity did he give in discovering the quantity of silver, that was mixed along with the gold, in the crown of King Hierem; whilst he reasoned upon that principle, that all bodies immersed in water, lose just so much of their weight, as a quantity of water equal to them in bulk weighs? Hence he drew this consequence, that gold being more compact, must lose less of its weight, and silver more; and that a mingled mass of both, must lose in proportion to the quantities mingled. Weighing therefore the crown in water and in air, and two masses, the one of gold, the other of silver, equal in weight to the crown; he thence determined what each lost of their weight, and so resolved the problem. He likewise invented a perpetual screw, valuable on account of its being capable to overcome any resistance; and the screw, that still goes by his own name, used in elevating of water. He, of himself alone, defended the city of Syracuse, by opposing to the efforts of a Roman general, the resources he found in his own genius. By means of many various warlike machines, all of his own construction, he rendered Syracuse inaccessible to the enemy. Sometimes he hurled upon their land-forces stones of such an enormous size, as crushed whole bodies of them at once, and put the whole army into confusion.—And when they retired from the walls, he still found means to annoy them; for with catapults and balistæ, he overwhelmed them with arrows innumerable, and beams of a prodigious weight. If their vessels approached the fort, he seized them by the prows with grapples of iron, which he let down upon them from the wall, and rearing them up in in the air, to the great astonishment of every body, shook them with such violence, as either to break them in pieces, or sink them to the bottom. And when the Romans thought of sheltering themselves from his pursuit, by keeping at a distance from the haven, he borrowed fire from heaven, and aided by his own ingenuity, wrapped them in sudden and inevitable conflagration.

The superior knowledge he had in science, and his confidence in the powers of mechanism, prompted him once to say to King Hierem, who was his patron, admirer, and friend; give me but some other place to stand upon, and I'll set the earth itself in motion: and when the king, amazed at what he had said, seemed to be in hesitation; he gave him a striking proof of the possibility of what he had advanced, by launching singly by himself a ship of a prodigious size. He built likewise for the king an immense galley, of twenty banks of oars, containing spacious apartments, gardens, walks, ponds, and all other conveniences suitable to the dignity of a great king. He constructed also a sphere, representing the motions of the stars, which Cicero esteemed one of the inventions which did the highest honor to human genius. He perfected the manner of augmenting the mechanic powers by the multiplication of wheels and pullies; and, in short, carried mechanics so far, that the works he produced of this kind even surpass imagination.

Nor was Archimedes the only one who succeeded in mechanics. The immense machines, and of such astonishing force as were those which the art of the ancients adapted to the purposes of war, are a proof they came nothing behind us in this respect. It is with difficulty we can conceive how they reared those bulky moving towers, an hundred and fifty-two feet in height, and sixty in compass, ascending by many stories, having at bottom a battering-ram, a machine of strength sufficient to beat down walls; in the middle a draw-bridge, to be let down upon the wall of the city attacked, in order to open a passage into the town for the assailants; and at top a body of men, who, being placed above the besieged, harassed them without running any risk. An ancient historian hath transmitted to us an action of an engineer at Alexandria, which deserves a place here. In defending that city against the army of Julius Cæsar, who attacked it, he by means of wheels, pumps, and other machines, drew from the sea a prodigious quantity of water, which he afterwards turned upon the adverse army to their extreme annoyance. In short, the art of war gave occasion for a great number of proofs of this kind, which cannot but excite in us the highest idea of the enterprizing genius of the ancients, and the vigor with which they put their designs in execution. The invention of pumps by Ctesbius; and that of water-clocks, automatical figures, wind-machines, cranes, &c. by Heron, who lived in the second century: and the other discoveries of the Grecian geometricians, are so very numerous, that it would exceed the limits of a chapter even to mention them.

Should we pass to other considerations, we shall find equally incontestable evidence of greatness of genius among the ancients, in the difficult and indeed astonishing enterprizes, in which they so successfully engaged. Egypt and Palestine still present us with proofs of this, the one in its pyramids, the other in the ruins of Palmyra and Balbec.* Italy is filled with monuments, and the ruins of monuments, which aid us in comprehending the former magnificence of that people; and ancient Rome even now attracts much more of our admiration than the modern.

The greatest cities of Europe give but a faint idea of that grandeur which all historians unanimously ascribe to the famous city of Babylon, which being fifteen leagues in circumference, was encompassed with walls two hundred feet in height, and fifty in breadth, whose sides were adorned with gardens of a prodigious extent, which arose in terraces one above another, to the very summit of the walls; and for the watering of those gardens they had contrived machines, which raised the water of the Euphrates to the very highest of those terraces; a height equalling that to which the water is carried by the machine of Marly. The tower of Belus, arising out of the middle of a temple, was of so vast a height, that some ancient authors have not ventured to assign the measure of it; others put it at a thousand paces.

Ecbatane, the capital of Media, was of immense magnificence, being eight leagues in circumference, and surrounded with seven walls in the form of an amphitheatre, the battlements of which were of various colors, white, black, scarlet, blue, and orange; but all of them covered with silver or with gold. Persepolis was also a city, which all historians speak of as one of the most ancient and noble of Asia. There remain the ruins of one of its palaces, which measured six hundred paces in front, and still displays the relics of its ancient grandeur.

The lake of Mœris is likewise a striking proof of the vast undertakings of the ancients. All historians agree in giving it above an hundred and fifty leagues in circuit; yet was it entirely the work of one Egyptian king, who caused that immense compass of ground to be hollowed, to receive the waters of the Nile, when it overflowed more than ordinary, and to serve as a reservoir for watering Egypt by means of its canals, when the overflowing of the river was not of height sufficient to enrich the country. Out of the midst of this lake, arose two pyramids, of about six hundred feet in height.

The other pyramids of Egypt, in their largeness and solidity, so far surpass whatever we know of edifices, that we should be ready to doubt of the reality of their having ever existed, did they not still subsist to this day. Mr. de Chezele, of the Academy of Sciences, who travelled into Egypt to measure them, assigns to one of the sides of the base of the highest pyramid, a length of six hundred and sixty feet, which reduced to its perpendicular altitude, makes four hundred and sixty-six feet. The freestones of which it is composed, are each of them thirty feet long; so that we cannot imagine how the Egyptians found means to rear such heavy masses to so prodigious a height.

The Colossus of Rhodes was another of the marvellous productions of the ancients. To give an idea of its excessive bigness, it need only be observed, that the fingers of it were as large as statues, and very few were able, with outstretched arms, to encompass the thumb.

In short, what shall we say of the other structures of the ancients, which still remain to be spoken of? Of their cement, which in hardness equalled even marble itself? of the firmness of their highways, some of which were paved with large blocks of black marble; and of their bridges, some of which still subsist irrefragable monuments of the greatness of their conceptions? The bridge at Gard, three leagues from Nimes, is one of them. It serves at once as a bridge and an aqueduct. It goes across the river Gardon, and joins together the two mountains, between which it is inclosed. It comprehends three stories; the third is the aqueduct, which conveys the waters of the Eure into a great reservoir, which supplies the amphitheatre and city of Nimens. The bridge of Alcantara, upon the Tagus, is still a work fit to raise in us a great idea of the Roman magnificence: it is six hundred and seventy feet long, and contains six arches, each of which measure above a hundred feet from one pier to the other; and its height from the surface of the water is two hundred feet. The broken remains of Trajan's bridge, over the Danube, are still to be seen; which had twenty piers of freestone, some of which are still standing, a hundred and fifty feet high, sixty in circumference, and distant one from another an hundred and seventy. Were all the admirable monuments left us by the ancients enumerated, they would compose a catalogue; the slight sketch here given of them, therefore, will more than suffice for the purpose of description. As to the ornaments and conveniences of their buildings, among many we shall mention but one, that of their using glass in their windows, and in the inside of their apartments, just in the same manner as we do. Seneca and Pliny inform us, that they decorated their rooms with glasses; and do not we the same in the use of mirrors and pier-glasses? But what will more shock the general prejudice is, that they should know how to glaze their windows, so as to enjoy the benefit of light, without being injured by the air; yet this they did very early. Before they discovered this manner of applying glass, which is so delightful and so commodious, the rich made use of transparent stones in their windows, such as the agat, the alabaster, the phengites, the talcum, &c. whilst the poor were under a necessity of being exposed to all the severities of wind and weather.

If we admire the ancients in those monuments which remain to us of the greatness of their undertakings, we shall have no less reason for wonder in contemplating the dexterity and skill of their artists in works of a quite different kind. Their works in miniature are well deserving of notice. Archytas, who was contemporary with Plato, is famous in antiquity, for the artful structure of his wooden pigeon, which imitated the flight and motions of a living one. Cicero, according to Pliny's report, saw the whole Iliad of Homer written in so fine a character, that it could be contained in a nut-shell; and Ælian speaks of one Myrmecides a Milesian, and of Callicrates a Lacedemonian, the first of whom made an ivory chariot, so small and so delicately framed, that a fly with its wing could at the same time cover it, and a little ivory ship of the same dimensions: the second formed ants, and other little animals, out of ivory, which were so extremely small, that their component parts were scarcely to be distinguished. He says also in the same place, that one of those artists wrote a distich in golden letters, which he inclosed in the rind of a grain of corn.

It is natural here to inquire, whether in such undertakings as our best artists cannot accomplish without the assistance of microscopes, the ancients had no such aid; and the result of this research will be, that they had several ways of helping the sight, of strengthening it, and of magnifying small objects.—Jamblichus says of Pythagoras, that he applied himself to find out instruments as efficacious to aid the hearing, as a ruler, or a square, or even optic glasses, were to the sight. Plutarch speaks of mathematical instruments which Archimedes made use of, to manifest to the eye the largeness of the sun: which may be meant of telescopes. Aulus Gellius having spoken of mirrors that multiplied objects, makes mention of those which inverted them; and these of course, must be concave or convex glasses. Pliny says, that in his time, artificers made use of emeralds to assist their sight, in works that require a nice eye; and to prevent us from thinking that it was on account of its green color only that he had recourse to it, he adds, that they were made concave, the better to collect the visual rays; and that Nero made use of them in viewing the combats of the Gladiators. In short, Seneca is very full and clear upon this head, when he says that the smallest characters in writing, even such as almost entirely escape the naked eye, may easily be brought to view by means of a little glass ball, filled with water, which had all the effect of a microscope, in rendering them large and clear; and indeed this was the very sort of microscope that Mr. Gray made use of in his observations. To all this add the burning glasses made by them, which were in reality magnifying glasses; nor could this property of them remain unobserved.

* It is proper to remark, that the temples and immense palaces of Palmyra, whose magnificence surpasses all other buildings in the world, appear to have been built at the time when architecture was in its decline.

HENRY BROUGHAM.

IT may be doubted if any man at present upon the earth is doing so much for the improvement of popular education and the diffusion of knowledge, as Henry Brougham. He makes no long dissertations upon the defects of education, nor does he preach, or scowl, or whine, about the ignorance, the corruption, or even the wretchedness of his countrymen, or the world. He forms no beautiful theories of the perfectability of human nature, the eleganee of virtue, the deformity of vice, or of the purity and elevation of a cultivated mind. He enters into no closet speculations upon the plans, by which, with a magic wand, he can in a trice change the earth into a paradise. He forms no patent machines, by which a knowledge of universal science can be thrown into the mind in one solid *mass*. He has never promulgated to the world any system of education, of morals and of civil society, by which all men may become enlightened without study or instruction, obedient without law, rich without industry, chaste and divinely pure without marriage, and equally learned, and pure, and elevated, and rich, and great, and happy, without effort; with nothing but 'circumstances.' No: he takes a more direct way of coming at the point,—more efficient measures for effecting his object. He asserts at once, and asserts boldly and fearlessly, that every man and every woman in the kingdom of Great Britain may be, and can be, and *shall* be enlightened.—He asserts more, that they can and must enlighten *themselves*. Upon the heels of assertion, tread *efforts*. His tongue gives the word, and his hand the blow, *together*. He maintains that no one in the kingdom is so much occupied as not to find time, and none so poor that they cannot spare money, to procure knowledge, to elevate their character, while it promotes and gives effect to their industry, and raises them above pleasures which are expensive as well as brutish. He not only tells his countrymen that they are able to instruct and elevate *themselves*, and by that means all procure a comfortable subsistence, respectability, and influence; but immediately aids them in the work.—He assists them in converting their senseless or pernicious amusements into rational or moral instruction. He aids them in forming societies, procuring books, cheap and simple apparatus to illustrate the sciences, and their application to the arts. He concentrates, combines and directs the intelligence, the sci-

ence, the benevolence, and the wealth of the nation, into one great fountain, from which may be diffused light, virtue, and happiness. He employs, as vehicles, to convey from the general fountain these articles of public good, cheap *practical* books, journals, pamphlets and tracts, which are scattered into workshops, farm-houses, taverns, and private families, in every corner of the kingdom. He urges upon men of learning and science to throw off their flummery, the learned phrases, the host of verbiage, which entangle and bewilder science in a dark and impenetrable maze, and present it in its native simplicity, and beauty, and grandeur: as the modest, but efficient and dignified handmaid, to administer to the wants of the virtuous and hardy mechanic, and of the honest, weather-worn farmer. He presses upon the laboring classes, and even the poor and ignorant, their ability and the necessity of procuring and using the materials which the learned and the rich have furnished at their hands, as fabrics of their own growth in knowledge, respectability and influence,—that by exerting they will increase their strength; that by depending upon themselves, they may possess and enjoy independence of others.

The motto which he holds up in conspicuous letters before them is, 'BEGIN.' If they cannot procure a library, borrow a pamphlet, or a tract, upon 'useful knowledge,' and meet, and read, and converse upon its contents. If they cannot erect or purchase a building, rent or borrow a public or a private room, till they can procure a better. If they cannot procure a laboratory and a complete set of chemical apparatus, let them borrow from a kitchen, a pitcher, a bowl, and a tumbler, and from the physician, a phial and an acid, and take the examples of a Franklin, a Priestley, or a Black, to direct their efforts. If they cannot procure an orrery patented and constructed in London, intended to illustrate at one view, the numerous and complicated motions of all the bodies in the solar system, but fitted to confuse and bewilder the mind, let them take an orange or an apple, and show simply and clearly the shape, surface, and motions of the earth.

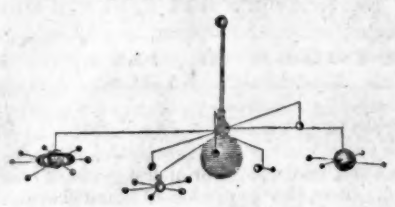
If they have not a complete set of mechanical powers neatly constructed, and finely polished by the hand of a mathematical instrument-maker in the metropolis, use a cane to show the principles of the lever, and the first circular pulley within their reach, to prove that the lever, the pulley, and the wheel and axis, are but varieties of the same thing. If they cannot give lectures with logical arrangement, rhetorical figures, and rounded sentences, let them congratulate themselves that ideas are better than sounds, and facts than flourishes. If they cannot learn in detail all the minutiæ in a complete system of science, let them prove by some simple experiment a single *practical* principle, which they constantly witness in the motion of their limbs, in a wheel, a plough, or an edged tool. If every person cannot be a profound or a critical scholar, he may be an enlightened, respectable, and useful citizen.

This great statesman, and distinguished patriot, congratulates his countrymen, that religion or government has nothing to fear from enlightened minds and elevated morals. That 'the time is past and gone, when *bigots* could persuade mankind, that the lights of philosophy were to be extinguished, as dangerous to religion; and when *tyrants* could proscribe the instructers of the people as enemies to their power. It is preposterous to imagine, that the enlargement of our acquaintance with the laws which regulate the universe, can dispose us to unbelief. To tyrants indeed, and to bad rulers, the progress of knowledge among the mass of mankind, is a just object of terror: it is fatal to them and their designs: they know this by unerring instinct, and unceasingly they dread the light. But they will find it more easy to curse than to extinguish.'

Since one bold and elevated spirit, by urging to immediate *action* his ignorant, degraded and suffering countrymen, to acquire knowledge, that they may assume the respectability and the power which tyrants and oppressors have wrested from their hands, has in a few years given greater purity and health, and will eventually present a new creation, in the intellectual and moral atmosphere resting upon Great Britain, we hope that every daily, weekly, monthly, and yearly Journal, in our Union; that every statesman and patriot, that every teacher and parent, that every clergyman, lawyer, physician, farmer, mechanic, and merchant; that every man, woman, and child, will say in the language of Mr. Brougham, and in a voice which will be heard from Canada to Mexico, and from the Atlantic to the Pacific,—'BEGIN.'

APPARATUS.

SCHOOL ORRERY.



CONNECTED with the apparatus for common schools is an orrery, representing the various bodies in the solar system, in their relative magnitudes, distances, motions, &c. It is to be suspended overhead, where it will be always in view, and yet out of the reach of injury from children, from falls, or other accidents. When thus suspended in view of a school, all the pupils, from the largest to the smallest, become familiar with the different bodies in the solar system, and with the most important operations and circumstances attending them.

Besides the orrery is a globe, which is useful, both in Astronomy and Geography. This globe, though simple and of trifling expense, has been found by uniform experience to be better fitted to illustrate the first principles of Geography and Astronomy than those which cost ten times as much. The price of the orrery is three dollars, and that of the globe is one dollar and fifty cents.

SEASONS.

THE instrument here represented is to show the change of seasons, and the revolution of the moon round the earth, with two or three of the fundamental principles in the doctrine of eclipses. The bodies represented are the sun, earth, and moon, with the moon revolving round the earth, and both revolving round the sun. During a revolution of the globe representing the earth, round that representing the sun, it will be seen how the one is situated in relation to the other in June, December, March and September. It will also be seen why the days are longest in June, and shortest in December, north of the equator, and why the days and nights are equal all over the earth in September and March.

In some future numbers of the Lyceum, the change of seasons, eclipses, &c. will be as fully and minutely illustrated as they can be by cuts, and in a way to render the use of the apparatus for these subjects perfectly plain and satisfactory.

It cannot be doubted that the orrery and globe ought to be in every primary school in the United States. Nor can it be doubted, but children will learn more about the shape, motions and great divisions of the earth, by a glance at the school globe, than they could possibly learn by books merely, in weeks or months. It is also true that a few minutes instruction from the globe, will render every lesson a child may afterwards get in a book, worth at least double what it would be without a clear understanding of the first elementary principles of Geography, which it is impossible to get from books merely. From the great importance of this instrument, to receive from books any considerable part of their value, and from the interest it creates among any collection of children, it is hoped that no school in New England or the U. States will fail to be furnished with one at the commencement of their winter operations.

Besides the orrery and globe, a numeral frame and a set of geometrical solids form part of the school apparatus; the one $1,50, the other $4,00. No part of the apparatus has done so much as that for Geometry. Wherever it has been introduced, it has rendered the science it is designed to illustrate, the most interesting subject in schools. It is certainly more elementary and fundamental than any other science.

These articles of apparatus are not only important and necessary to render schools what they ought to be, but the mode and the means of providing them are perfectly plain and easy. If every teacher, at the opening of winter schools, should propose to his pupils to contribute twenty-five cents each, and parents enable their children to accede to the proposal, the act of *contributing* would afford an immediate reward, by enlarging their hearts, while the instruction and entertainment they provided for each other, would furnish for themselves a continued exercise and improvement of their minds.

METEOROLOGY.

THE Savannah (Ga.) Female Seminary has set an example worthy of being followed by every literary institution in our land. We cannot conceive of a useful and interesting object being more happily or advantageously effected, than Journals and Tables of Meteorology, kept by the various seminaries in all parts of the country, and so compared and presented to the public, that each can see the state and changes of the atmosphere and the weather, as exhibited by all the rest.

We here give a schedule of meteorology, furnished by the young ladies of the Female Seminary in Savannah, (Ga.) through the hands of Mr. WILLIAMS, one of the Principals. In our next we shall give another table, furnished from the same source.

As we have encouragement from several other places in different sections of the country, of similar favors, we hope before the close of the year, to be able to exhibit some facts respecting a *neglected* and interesting subject, which will afford instruction and entertainment to most of our readers.

As the Lyceum is already introduced into many schools, besides that at Savannah, and one or two others in Georgia, we are encouraged to hope that the time is not distant, when most schools in our country will not only be furnished with *new* exercises for reading and for science, every week, but when the pupils themselves will furnish the columns of a Family and School Lyceum, with materials for entertaining each other. *What an intellectual, moral, and beautiful co-operation would such an arrangement furnish among those who are soon to give influence and character to our nation, and through that to the civilized world!*

METEOROLOGICAL DIARY,—FROM JULY 28th TO AUGUST 3d.
Observations made at 9 A. M.; 2 & 6, P. M.

Days.	Average.	Thermometer.			Wind.			Weather, &c.		
28th	82	77	85	84	E. E.	"	"	Clear all day.		
29th	82	73	85	84	N. E. E. S. E.			Cloudy.		
30th	85	83	87	85	W. S. E.	"		Clear and a little hazy.		
31st	85	83	87	85	S. W. S. E. S.			Cloudy and showery.		
1st	80	78	81	80	N. E. E. S. E.			Cloudy. Thunder, rain		
2d	81	79	82	81	S. E. N. E. S. E.			Do.; showery all day.		
3d	83	80	85	84	S. S. E. S. E.			Cloudy.		

REMARKS FOR THE WEEK.

We have had frequent showers this week, accompanied by wind and thunder. Average of the thermometer, 82 degrees —4 degrees colder than last week—By 1 degree the coldest during the month. The health of the city remains the same as reported last week.

Yours,

Savannah Female Seminary.

Miss M. E. A.

Remarks for July, 1832.—1. Our observations have been taken three times a day, viz.: at 9 A. M., 2 and 6 P. M.

2. The mean of the Thermometer for the month, 84°; it being 2 degrees warmer on an average, than the preceding month.—Maximum 90° on the 21st. Minimum 78° on the 14th.

3. At 9 o'clock, A. M. Max. 84° on the 8th, 9th, 22d, and 23d. Min. 74° on the 14th. Mean for the same hour, 80°.

4. At 2 o'clock, P. M. Max. 93° on the 21st. Min. 80° on the 1st and 14th. Mean same time 86°

5. At 6 o'clock, P. M. Max. 94° on the 21st. Min. 78° on the 14th. Mean for the same hour 86°.

6. There has been 7 rains, accompanied with thunder, on 3d, 4th, 9th, 13th, 22d, 23d, and 24th; two days showery, the 14th and 31st.

7. Winds—N. E. and E. 11 days; S. W. S. and S. E. 15 days; N. W. W. and S. E. 5 days; many days the wind has been variable

8. The 21st was the warmest day this season, average of the Thermometer on that day 90°.

9. By referring to a diary kept in this city, for July, 1831, I find the weather has been very similar, and 1 degree warmer.

10. Our city is free from all disease, and was never more healthy than at present.

Yours, W. H. W.

Savannah Female Seminary.

METEOROLOGICAL DIARY,—FROM AUGUST 25th to 31st.
Observations made at 8 A. M.; 2 & 6 P. M.

Days.	Average.	Thermometer.			Wind.			Weather, &c.		
25th	83	78	86	85	N. E.	"	"	Broken clouds.		
26th	80	80	82	79	N. N. E.			Broken clouds.		
27th	81	76	84	82	N. W. S. E. E.			Cloudy and rain.		
28th	84	80	87	85	S. W. S. S. W.			Thunder and rain.		
29th	83	77	88	84	N. W.	"	"	Thunder and rain.		
30th	84	80	86	85	N. W. E. N. E.			Broken clouds, rain.		
31st	85	80	88	86	N. N. E. S. E.			Clear all day.		

REMARKS.—We have had frequent rains during the week. Average of the Thermometer, 83 degrees; 1 degree warmer than the last week. The health of the city continues as last reported.

Yours,

Savannah Female Seminary.

Miss M. W. O.

Remarks for August, 1832.—1. Ther. Ex. Average for the month 82°, 2° colder than the preceding month. Max. 85° on the 10th, 11th, and 31st. Min. 80° on the 1st and 26th.

2. Ther. Ex. at 8 o'clock, A. M. Max. 82° on the 7th and 15th. Min. 77° on the 29th. Mean 80°.

3. Ther. Ex. at 2 o'clock, P. M. Max. 90° on the 11th. Min. 81° on the 1st. Mean 85°.

4. Ther. Ex. at 6 o'clock, P. M. Max. 88° on the 10th. Min. 79° on the 26th. Mean 83°. The Mercury has not fallen below about 77° at any time during the month.

5. The weather has been what would be generally considered clear only 2 days, the 10th and 31st—cloudy 4 days, the 3d, 9th, 25th and 26th—the rest of the month 25 days rainy. Prevailing winds N. E. and E. 11 days—S. E. and E 10 days—S. W. and S. 6 days—N. W. and W. 4 days; 17 days showery and 8 days rain, accompanied with thunder and lightning. In putting down the direction of the wind, that is taken which may be considered the prevailing wind for the day.

6. The month, taken as a whole, has been uncommonly wet and unpleasant.

7. The inferior planet Mercury was at its greatest elongation, (27° 26′) August 12th—stationary 26th, and will be inferior, September 8th. Ceres was in opposition on the 4th. The superior planet Uranus, came in opposition on the 8th. The foregoing changes of the inferior planets, from the superior to the inferior conjunction, passed the meridian after the Sun, and set after him in the evening. The inferior planets, from the inferior to the superior conjunction, passed the meridian before the Sun, and rose before him in the morning.

8. On the 27th was the most considerable tide; had the wind been favorable, it would have been much higher.

9. Biela's Comet, so called from his first having seen it in 1826, was distant from the earth at Washington on the 5th, about 148 millions of miles, and on the 22d, 117 millions. The 6th of Sept. it will be about 94 millions of miles from the earth. Its nearest approach to the earth will be on the 23d of October, distant 51 millions of miles. It will be brightest on the 13th of November, when it will rise E. N. E. about 10 o'clock in the evening, and comes to the meridian at about 4 the next morning. Its nearest approach to the Sun will be on the 28th of November, distant only 83 millions of miles. All who feel anxious to view this splendid Comet, would do well to prepare themselves for it; they have no time to lose.

10. Our city is very healthy.

Yours, W. H., W.

Savannah Female Seminary.

From Mitchell's First Lines of Science.

TEMPERATURE.

THERE are considerable variations in the temperature of the air in any particular place, exclusive of the difference of the seasons and climates, which change cannot be produced by heat derived from the sun, as its rays concentrated have no kind of effect on air; those, however, heat the surface of our globe, which is communicated to the immediate atmosphere: it is thus that the temperature is highest where the place is so situated as to receive with most effect the rays of the sun, and that it varies in each

region with the season; it is also the cause why it decreases in proportion to the height of the air above the surface of the earth. The diminution of temperature from the pole to the equator, takes place in arithmetical progression; or the annual temperature of all the latitudes are arithmetical means between the mean annual temperature of the equator and the pole.

The mean temperature of the equator being 84 degrees, and that of the pole 31 degrees, to find the mean annual temperature for every other latitude, we have only to find 88 arithmetical means between 84 and 31.

It has been found that in every degree of north latitude, January is the coldest month; July the warmest in all above 48 degrees; in lower, August. Every latitude where existence can be maintained, has a mean of 60 degrees, two months of the year at least, which is requisite for the production of those articles by which man supports life. The temperatures within ten degrees of the poles vary little, and the case is similar within the same distance from the equator; those of different years near the latter differ very little, but the differences increase as the latitudes approach the poles. The temperature of the atmosphere likewise diminishes gradually in proportion to its height above the level of the sea.

Mr. Kirwan shows that the rate of diminution depends upon the precise temperature of the surface of the earth where an experiment is made.

This graduall approach to cold demonstrates that at a certain height eternal congelation must prevail; that height varies of course according to the latitude of the place, being highest at the equator and gradually descending on approaching the poles; it is also lower in the winter. The cold on the summit of Pinchinca was found by M. Bouguer to extend, every morning previous to the rising of the sun, from seven to nine below the freezing point; from which he conjectured that the mean height of the term of congelation (or that region where water congeals on some part of every day in the year) between the tropics, is 15,577 feet above the level of the sea; in latitude 28 degrees he supposes it to be 43,440 during summer. Taking the differenee between the freezing point and the temperature of the equator, it appears, that it bears the same proportion to the term of congelation at the equator, that the difference the mean between the temperature of any other degree of latitude and the freezing point bears to the term of congelation in that latitude.

Estimating the diminution from this method, we find that heat lessens in an arithmetical progression: and from the same premises it may be concluded, that the warmth of the air at some distance from the earth is not to be attributed to the raising of heated strata of air from the earth's surface, but to the conducting power of the air.

The upper strata of the atmosphere are frequently warmer in winter, and the preceding rule is applicable to the temperature of the air during the summer months only. According to the Philosophical Transactions for 1777, a thermometer placed on the summit of Arthur's Seat, the 31st of January, the year before, stood six degrees higher than a second at Hawk's Hill, situated 684 feet below it. This superior heat is considered by Mr. Kirwan to be produced by a current of heated air flowing from the equator towards the north pole during our winter.

It has been a generally received opinion, that the southern hemisphere, beyond the 40th degree of latitude, is much colder than the corresponding parts of the northern. This is true only with respect to the summer of the former; but the winter in the same latitude is milder than in the latter.

Inconsiderable seas, in temperate and cold climates, are colder in winter and warmer in summer than the standard ocean, as they are necessarily under the influence of natural operations from the land, and its temperature.

Continents have a colder atmosphere than islands situated in the same degree of latitude; and countries lying to the windward of the superior classes of mountains, or forests, are warmer than those which are to the leeward. Earth, always possessing a certain degree of moisture, has a greater capacity to receive and retain heat than sand or stones. The latter therefore are heated and cooled with more rapidity. It is from this circumstance that the intense heats of Africa and Arabia, and the cold of Terra del Fuego, are derived. The temperature of growing vegetables changes very gradually; but there is a considerable evaporation from them. If these exist in great numbers, and congregated, as in forests, their foliage preventing the rays of the sun from reaching the earth, the immediate atmosphere must be greatly effected by the ascent of chilled vapors.

COMMON THINGS.

ALCOHOL.

In an extract from another work inserted in a late number of the Lyceum, on the subject of fermentation, it was remarked that substances, during the process of fermentation, underwent three changes, or stages of fermentation; the first vinous, or producing spirit, the second acetous, or producing acid, the third putrid, or putrifactive, or ending in putrifaction. A change previous to either of these, appears evident, at least in some cases. Apples, though sour, when bruised or formed into pumice, become sweet; of course sugar is formed. The change here referred to, is so obvious, and so entirely distinct from either of the others, that the most careless observer must have noticed it.

It seems to us then, that the first change produced by fermentation, in many cases at least, is the formation of sugar; the second the destruction of the sugar, and the formation of alcohol; the third the destruction of the alcohol, and the formation of vinegar; and the fourth the destruction of the acid and ending in putrifaction.

Alcohol, then, is always produced, whether in beer, cider, wine, brandy, gin, or any other kind of spirits, by the process of fermentation carried on in sugar: in other words sugar is fermented and destroyed, and alcohol formed. It appears not to be material from what source the sugar is obtained; whether from cane, the maple tree, vegetation as in malt, or a previous step of fermentation, as in grain for gin, in the apple and many other substances. Molasses, by undergoing fermentation, is changed into alcohol, and distilled in the form of rum. Rye, Indian corn, potatoes, and many other vegetables are fermented, first forming sugar, and then alcohol, when it is distilled in the form of gin, whiskey, or spirits known by some other name. Apples, pears, and peaches are fermented with similar results, as in grain, but the spirit is known by the name of cider, perry, and, after distilling, by cider brandy, peach brandy, &c.

It seems then, that Alcohol is always produced by the fermentation of sugar, and that the fermentation and destruction of sugar always produces alcohol, whether it is found in beer, cider, perry, wine, cordials, rum, or any other form.

Alcohol may also be fermented when greatly diluted, and aided by yeast, when that is changed into an acid. The acetous fermentation is more difficult to carry on, and less rapid than the vinous; it is even so easily excited, and so difficult to check, that it frequently passes its bounds and produces an acid. Hence the tendency of cider, beer and wines to become sour.

This product of the action of oxigen upon other substances, is by no means confined to the few articles commonly recognized as containing spirit or alcohol. There is some reason to believe that in the decay of animal and vegetable substances generally, there is more or less alcohol produced. Even in marshes and in all collections of stagnant water, before the putrifactive process commences, may alcohol be produced.

The vinous fermentation, by which alcohol is produced, being a necessary step in a very important process in nature, cannot fail to be interesting to every lover of science, and like every other operation going on under the laws established by the Creator, was designed for the happiness of those for whom every thing was made, and every law ordained in the physical, as well as the intellectual and moral creation. But like almost every law, and every operation, it has been perverted by those for whom it was designed as a blessrng, and has thus become one of the greatest scourges which ever visited our world. Alcohol, as a servant, is kind, faithful, and exceedingly useful in many of the arts; but, as a master, it is a cruel and unrelenting tyrant. Whatever science or common sense can prove, it certainly cannot prove that tobacco was made to eat, or rum to drink.

Though neither alcohol nor melted lead were designed for drink, both are useful in the arts. As a chemical agent, alcohol is active and important. No substitute could probably supply its place for producing heat in many cases in chemical experiments; and it is convenient for the same purpose in many cases in the arts.

As a solvent too, it is extensively useful both in science and the arts. Nothing would probably supply its place to hatters in dissolving gum shellack for stiffening hats. For many of the gums, as they are commonly called, alcohol is the best solvent; and by such solutions numerous kinds of varnishes are formed, of great value to various artists.

We should be ready to accede to the assertion which seems to have become common, that alcohol contains no nutriment, were we not in want of one thing, viz. *proof*. If assertion was proof, we should have an abundance of it; but we have always been reluctant to receive assertions on such subjects, even when furnished in great numbers and by the highest authorities, as a ground of belief.

If assertions are not proof that alcohol contains no nutriment, it may be asked if science furnishes it. The answer to that question is, no. Sugar, starch, and gluten are acknowledged by all to be nutricious. Each of them is composed of oxgien, hydrogen, and carbon. Alcohol is composed of the same. When starch is changed into sugar, it does not lose its nutriment; and science can certainly furnish no proof, and of course no legitimate conclusion, that when sugar is changed into alcohol it ceases to be nutricious.

As we cannot find, either in assertions or science, the proof we deem necessary to fall in with the common opinion on this subject, we resort to facts and experience. And how is the proof there? Not in our opinion that alcohol contains no nutriment, for we think we have known individuals who literally lived upon rum. They 'live fast,' it is true, but they live. Some individuals within our recollection, have performed severe labor at farming with almost no food for weeks but rum. We did not admire their living or their taste; but they lived and labored, for aught we could see, upon alcohol. So far as our knowledge extends, beer drinkers and brandy drinkers oftener show full than emaciated faces as a consequence of their living. We are aware that this does not afford conclusive proof that those liquids contain nutriment; and it probably will not be contended that it proves that they do not contain it.

We are not apprehensive that by questioning some of the charges laid against so great a tyrant and monster as alcohol, we shall forfeit the confidence of our friends, or expose the Family Lyceum to the charge of anti-temperance; for justice requires that the worst person, and the worst thing in the world, should have their due; and that no one should be condemned without first being proved guilty whereof he is accused. And whenever the accusers shall have proved their charge, we will unite our voice with that of the multitude in declaring that alcohol has not even the merit of some other poisons, of adding any thing to the sustenance of life.

THE BIBLE.

Sir William Jones, who was the most learned man of any age, being familiar with ancient and modern writings in twenty-eight tongues, speaks thus of the Bible:

'I have carefully and regularly perused the scriptures, and am of opinion, that this volume, independently of its divine origin, contains more true sublimity, more exquisite beauty, purer morality, more important history, and finer strains, both of poetry and of eloquence, than could be collected within the same compass, from all other books which were ever composed, in any age or in any idiom.'

Rousseau could not but say: 'The majesty of the scriptures strikes me with astonishment. Never was the most profound wisdom expressed with so much energy or simplicity.'

Fenelon observes, in comparing it with those standards of excellence, the classic authors: 'The scripture surpasses the most ancient Greek authors vastly, in naked simplicity, loveliness and grandeur. Homer himself never reached the sublimity of Moses' songs, or equalled Isaiah in describing the majesty of God. Never did any ode, either Greek or Latin, come up to the loftiness of the psalms. In all its diversified compositions, every part bears the peculiar character that becomes it.' The history, the particular detail of laws, the descriptions, the vehement and pathetic passages, the miracles and prophecies, the moral discourses—in all these appears a natural and beautiful variety. In short, there is as great a difference between the heathen poets and the prophets, as there is between a false enthusiasm and the true.

DIADEM,

In antiquity, was a head band, or fillet, worn by kings, as a badge of their royalty. It was made of silk, thread, or wool, and tied round the temples and forehead, the ends being tied behind, and let fall on the neck.

Diadem, in heraldry, is applied to certain circles or rims, serving to inclose the crowns of sovereigns, and to bear the globe and cross of the flower-de-luces for their crest.

COMETS.

Comets are supposed to be solid opaque bodies of various magnitudes, with long transparent tails resembling a pale flame, and issuing from the part of the comet farthest from the sun. They move round the sun in very elliptic orbits, and cross the orbits of the planets in all directions. From the curved direction of their paths, Newton concludes, that when they disappear they go much beyond the orbit of Jupiter; and that, in their perihelion, they frequently descend within the orbits of Mars and the inferior planets. He computed the heat of the comet which appeared in 1680, when nearest the sun, to be 2000 times hotter than red hot iron, and that it must retain its heat until it comes round again, even if its period should be more than 20,000 years, and it is computed to be only 575.

CAMPHOR.

Camphor is the peculiar juice of a species of laurel called the camphor tree, which is abundant in China, in Borneo, and in Ceylon. It becomes concrete by exposure to the air. It is remarkably inflammable, and is used by the Indian Princes to give light in their rooms. It is pungent, volatile, acrid, and strongly aromatic. These qualities have rendered it useful as a medicine, and in sick rooms to prevent contagion. It is also placed in collections, to keep off the small insects that prey upon the specimens.

DIAMOND.

In the glass trade, an instrument used for squaring the large plates or pieces, and among glaziers, for cutting their glass. The diamonds are differently managed. That used for large pieces, as looking-glasses, is set in an iron ferule, about two inches long, and a quarter of an inch in diameter; the cavity of the ferule being filled up with lead to keep the diamond firm: there is also a handle of box or ebony fitted to the ferule, by which it is held.

SCHOOL AGENT SOCIETY.

The readiness with which the friends of Education at the West, may be led to co-operate with those at the East, through the medium of the School Agent Society, is proved by numerous letters already received by the First Corresponding Secretary, from gentlemen in the Western Valley, an extract from one of which we here give.

'Rock Spring, Illinois, Sept. 4th, 1832.

Dear Sir:

Your very interesting letter, with three copies of the 'Family Lyceum,' I found in my desk, on my return home from a tour to the northern counties, two days since. I feel myself much obliged for your attention, and shall do *all* my time and abilities will permit, to advance the objects you mention. Your projected paper is the *very thing* of all others I have long desired to see, and I sincerely hope it will not want patrons and pecuniary support.

The 'School Agents' Society,' is also a *desideratum*. Such an institution I have long thought was greatly needed in our country. It only requires enlargement in its plans and purposes, and the requisite funds, to meet my full views as to the exigencies of our country.

We want an Institution, that shall be to Primary Schools and Common Education, what the American Sunday School Union is to *religious instruction*—a Society to send out Agents in every state and district,—to arouse the mass of the people to vigorous action—*and to publish a system of School Books*, and furnish Apparatus for Common Schools, as that noble Institution does for Sunday Schools.

I have heretofore published considerable in my little paper, on Education and Primary Schools; but I will arrange to publish two or three columns in each paper, and shall take the privilege of drawing largely from the 'Family Lyceum.'

It will afford me pleasure to aid in getting up County Lyceums, or those on a smaller scale; and I have already determined to spend a month or two next winter in this business—amongst which will be a series of Lectures at Vandalia, during the session of our Legislature. At present, my time is very much occupied, and indeed pressed, with religious meetings.'

FUEL.

Wood is now eight dollars a cord, and coal ten dollars a ton. On the first of March next, wood will be five dollars and coal six.

REMITTANCES.

Five Dollars, on the United States Bank, will be received by mail for three papers, from States where the currency does not admit of sending two dollars of current money for one number.

THE ARTS.

[Continued from our last.]

PORCELAIN.

THE investigations of Reaumur, already alluded to, were undertaken with more rational views, and prosecuted with a more liberal feeling. The result of his researches was communicated by him to the Academy of Sciences, and published by that body in 1727 and 1729. Having procured specimens of Oriental, Saxon and French porcelains, and broken them, he proceeded to examine their internal structure. The grain in both the Chinese and Saxon pieces appeared compact, smooth, and shining; while that of the French ware was less close and fine, without lustre, and its grain resembled sugar. He next proceeded to ascertain their habitudes on exposure to great heat in a crucible, and reported that all the European specimens were melted, while that of China remained unaltered. This most essential difference led Reaumur to discover the true nature of porcelain, which is a semi-vitrified compound, in which one portion remains infusible at the greatest heat to which it can be exposed, while the other portion vitrifies at that heat, and enveloping the infusible part, produces that smooth, compact, and shining texture, as well as transparency, which are distinctive of true porcelain. Macquer, in his chemical dictionary, asserts, that Reaumur was wrong in classing the Saxon manufacture with the other fusible porcelains of European production; since the materials of which it is composed have always been similar to those of which the China ware is made, one portion being absolutely infusible during the baking.

In his examination of the two porcelain earths received from China, which are called in that country pe-tun-tse and kao-lin, Reaumur made a small cake of each substance, separately, and exposed both to the heat of a porcelain furnace. One, the pe-tun-tse, was fused by this means, without any addition; while the other, kao-lin, gave no sign of fusion. He next intimately compounded the two earths, and found, when the mixture was baked, that it had acquired all the qualities of the finest Chinese ware.

All that was then wanting for the perfect imitation of this admired production was the discovery of materials analogous to the specimen furnished by D'Entrecolles. The search for these was very speedily successful; and the manufacture of porcelain having, from this time, been taken under the royal patronage in France, the works of Sevres produced specimens of art which vied successfully with those of Dresden and China.

Mr. Jonas Hanway, in the account of his travels published in 1753, has given a detailed account of the immense collection of porcelain deposited in the Chinese palace at Dresden.

'The vaults of this palace,' says Mr. Hanway, 'consist of fourteen apartments filled with Chinese and Dresden porcelain. One would imagine there was sufficient to stock a whole country; and yet they say, with an air of importance, that a hundred thousand pieces more are wanted to complete the intention of furnishing this single palace.

'Here are a great number of porcelain figures of wolves, bears, leopards, &c. (some of them as big as the life,) a prodigious variety of birds, and a curious collection of different flowers. A clock is preparing for the gallery, whose bells are to be also of porcelain: I heard one of them proved, and think they are sufficient to form any music; but the hammers must be of wood.

'Here are forty-eight large China vases, which appear to be of no use, nor any way extraordinary, except for their great size; and yet his Polish majesty purchased them of the late king of Prussia at the price of a whole regiment of dragoons.'

One part of this collection must have been peculiarly interesting, as it exhibited, in an orderly arrangement, specimens of Dresden manufacture laid up by this king of Poland from the first efforts of De Botticher, through every subsequent gradation; 'an idea,' says Mr. Parke, 'truly philosophical, and which reflects more honor on his memory than the bartering away the liberties of his subjects for pieces of foreign porcelain.'

Frederick the Great, when he conquered Saxony, forcibly carried away several of the best workmen from the manufactory at Meissen, near Dresden, and conveyed them to Berlin, where, since that time, a considerable quantity of very good porcelain has been made for the private advantage of the monarch. As many as 500 men are constantly employed in the establishment; but although much of their material is drawn from Saxony, the Prussian porcelain has never equalled in quality that of Dresden.

It is generally believed, that since the time when they were first established by the Romans, potteries have always existed in Staffordshire, but it is certain that until the beginning of the eighteenth century, the manufacture was confined to a few objects of the commonest and coarsest description.

The district in this county, wherein the great bulk of English manufactured earthen ware is produced, is situated about a mile from the borders of Cheshire. The potteries commence at a village called Golden Hill, and extend for a distance of more than seven miles, passing through other towns and villages to Lane End. The names of the places comprised in this district, intermediate between the two already mentioned, are Newfield, Smithfield, Tunstall, Longport, Burslem, Cobridge, Etruria, Hanley, Shelton, Stoke, Lower Lane, and Lower Delf. All these have formerly been sufficiently distinct from each other; but the increase of the staple manufacture of the district has called for the erection of so many new potteries and dwelling-houses, that their individuality has been lost, and to a stranger the whole presents very much the appearance of one large town. In every part of the kingdom, except the district itself, the whole are ranked under one general name, that of the Potteries. Etruria is the creation of the celebrated Josiah Wedgwood, by whom the place was thus named after one of the ancient Italian States, celebrated for the tasteful forms it gave to its pottery, specimens of which have materially promoted the improvement of our modern English wares.

In the year 1686, when Dr. Plot published a Natural History of Staffordshire, its traffic in earthen ware was very unimportant, being carried on only by the workmen themselves, or by pedlars, who conveyed the pieces in baskets on their backs through the adjoining counties. About the time just mentioned (1690), two brothers, named Elers, came from Nuremberg, in Holland, and settled at Bradwell, where they made an improved kind of red ware, and introduced the art of glazing the vessels by throwing common salt into the oven at a certain period of the baking.* Every precaution was used by the brothers to keep their processes secret; and it is probable that this circumstance, joined to the success of the strangers, excited the enmity and jealousy of their neighbors to the degree which obliged them to leave the country. The pretext assigned for this persecution was the alarm occasioned by the fumes from their kilns during the time of glazing. These fears subsided, however, when the process was continued by their successor. This man, whose name was Astbury, had, it is said, become master of their secrets by a singular stratagem. Feigning to be of weak intellect, and assuming an appropriate vacuity of countenance, he obtained employment in the Bradwell works, and submitted to all the drudgery and contumely which were drawn upon him by his supposed imbecility. By this course of proceeding, he was enabled, unsuspected, to acquire a knowledge of all that was done in the manufactory, and to make models for his own use of the utensils.

The advantages of this method of glazing with salt were so apparent, that in a short time it was very generally adopted; and on Saturday, the day appropriated to this process, the thick fumes from nearly sixty potteries, filled the towns to a degree which darkened the atmosphere, and covered the hills of the surrounding district.

To Astbury is generally ascribed the introduction of white stone ware, by the adoption of calcined flints in its composition. The popular version of the origin of this improvement states, that 'while travelling to London on horseback, in the year 1720, Astbury had occasion, at Dunstable, to seek a remedy for a disorder in his horse's eyes; when the ostler at the inn, by burning a flint, reduced it to a fine powder which he blew into them. The potter, observing the beautiful white color of the flint after calcination, instantly conceived the use to which it might be applied in his art.'

The merit of this man has been somewhat overlooked, while contemplating the greater claims to admiration possessed by his more philosophic successor in the course of improvement. That could have been no common mind, however, which led Astbury to the long-continued pursuit of his object, by means so humiliating; and which also enabled him, on the occasion just related, to seize upon a fact thus accidentally presented, and which, although of high importance to his art, might have passed unheeded before the eyes of many a common-place manufacturer.

The step thus made was of consequence in preparing the way for the greater advances towards perfection, afterwards accomplished by Mr Josiah Wedgwood. This extraordinary man owed none of his success to fortuitous circumstances. Devoting his mind to patient investigations, and sparing neither pains nor expense in accomplishing his aims, he gathered round him talented artists from different countries, and drew upon the stores of science for aid in pursuing the objects of his praiseworthy ambition. The early and signal prosperity whereby his efforts were attended, served only as a motive urging him forward to new exertions, and as the means for calling forth and encouraging talents in others, in a manner calculated to promote the welfare of his country. Previously to his time, the potteries of Staffordshire produced only inferior fabrics, flimsy as to their materials, and void of taste in their forms and ornaments---the best among them being only wretched imitations of the grotesque and unmeaning scenes and figures portrayed on the porcelain of China. But such have been the effects resulting from the exertions and example of this one manufacturer, that the wares of that district are now not only brought into general use in this country, to the exclusion of all foreign goods, which had before been largely imported, but English pottery has since been sought for and celebrated throughout the civilized world, and adopted even in places where the art was previously prosecuted. An intelligent foreigner, M. Faujas de Saint Fond, writing on this subject, says, 'its excellent workmanship, its solidity, the advantage which it possesses of sustaining the action of fire, its fine glaze impenetrable to acids, the beauty and convenience of its form, and the cheapness of its price, have given rise to a commerce so active and so universal, that in travelling from Paris to Petersburgh, from Amsterdam to the further part of Sweden, and from Dunkirk to the extremity of the south of France, one is served at every inn upon English ware. Spain, Portugal, and Italy, are supplied with it; and vessels are loaded with it for the East Indies, the West Indies, and the continent of America.'

It is not among the least of Mr. Wedgwood's merits, that he overcame the disadvantages of a defective education; and, amid the calls of an incessantly active life, found time wherein to school his mind in all the discipline necessary for investigations purely scientific. The ample fortune which he acquired was ever ready for promoting the spread of knowledge, encouraging the efforts of genius, and lessening, as far as possible, the sufferings of his fellow creatures His charities, public and private, and especially in his own district, were exemplary and consistent. He gave life to many objects of public utility. The Trent and Mersey canal was undertaken and accomplished through his influence; and by the benefits it has produced to the district, and to its proprietors, has fully approved his wisdom in its promotion.

The principal inventions of Mr. Wedgwood were—1. His *table ware;* the merits of which are, that it has a dense and durable body, and is covered with a brilliant glaze, capable of bearing uninjured sudden and great vicissitudes of heat and cold. This ware, as it was capable of being manufactured with ease and expedition, could be sold at a cheap rate, and would still yield a handsome profit to the inventor. Its various qualities, so superior to any possessed by previous manufacturers of either domestic or foreign production, caused this ware to be taken into immediate and universal favor with the public. Among others, the queen bestowed upon it the tribute of her admiration and patronage; commanded it to be called *queen's ware*, a name which it continues to bear to the present day; and honored Mr. Wedgwood by appointing him her majesty's potter.

2. A *terra cotta*, which could be made to resemble porphyry, granite, Egyptian pebble, and other beautiful stones of the silicious or chrystalline order.

3. *Basaltes*, or black ware. This was a black porcelainous biscuit, having nearly the same properties with the natural stone. It would emit sparks when struck with steel; was capable of taking a high polish; resisted acids; and would bear, without injury, a stronger degree of heat than even the natural basaltes.

4. *White porcelain biscuit.* This ware had a smooth, wax like appearance, and was possessed of all the properties exhibited by the preceding invention, differing from it only in regard to its color.

5. *Bamboo*, or cane-colored porcelain biscuit, of the same nature as the preceding.

6. *Jasper.* This was also a white porcelainous biscuit, of exquisite delicacy and beauty, having in general all the properties of the basaltes, with this addition, that it would receive through its whole substance, from the admixture of metallic oxides, the same colors as those oxides communicate to glass or enamel in fusion. This peculiar property, which it shares with no other porcelain or earthen ware body of either ancient or modern composition, renders it applicable, in a very pleasing manner, to the production of cameos, portraits, and all subjects that require to be shown in bas-relief; since the ground can be made of any color that may be preferred, while the raised figures are of the purest white.

7. A *porcelain biscuit*, possessing several properties that render it invaluable to the chemist, and which have occasioned this invention to be brought into general use in all laboratories. The ware is exceedingly hard, being little inferior in this respect to agate, whence it is peculiarly adapted for forming mortars. It resists the action of the strongest acids and of all corrosive substances, and has the further quality of being perfectly impenetrable by any known liquid.

[Concluded in our next.]

*The salt is decomposed by this means; and, rising in fumes, the alkali which it contains combines with the silica of the ware, and forms a true glass which covers the entire surface.

From Mitchell's Encyclopædia.

GEMS.

THIS word is used to denote such stones as are considered by mankind as precious. These are, the diamond, the ruby, the sapphire, the topaz, the chrysolite, the beryl, the emerald, the hyacinth, the amethyst, the garnet, the tourmalin, the opal; and to these may be added, rock chrystal, the finer flints of pebbles, the cat's eye, the oculus mundi, or hydrophanes, the chalcedony, the moon stone, the onyx, the cornelian, the sardonyx, agates, and the Labrador-stone.

Diamond is a precious stone, which has been known from the remotest ages. When pure, it is perfectly transparent like chrystal, but much more brilliant. Its figure varies considerably; but most commonly it is chrystalized in the form of a six-sided pyramid. It is the hardest of all bodies; the best tempered steel makes no impression on it. Lustre, splendent, and internally perfect adamantine. Cleavage octohedral, or parallel to the sides of an octohedron. Foliated structure. Fragments octohedral or tetrahedral. Semitransparent. Refracts single. Scratches all known minerals. Rather easily frangible. Streak grey. Specific gravity 3.4 to 3.6. It consists of pure carbon, as we shall presently demonstrate. When rubbed, whether in the rough or polished state, it shows positive electricity; whereas rough quartz affords negative. It becomes phosphorescent on exposure to the sun or the electric spark, and shines with a fiery light. In its power of refracting light, it is exceeded only by red-lead ore and orpiment. It reflects all the light falling on its posterior surface at an angle of incidence greater than 24° 13', whence its great lustre is derived. Artificial gems reflect the half of this light. It occurs in imbedded grains and chrystals in a sandstone in Brazil, which rests on chlorite and clay-slate. In India the *diamond bed* of clay is underneath beds of red or bluish-black clay; and also in alluvial tracts both in India and Brazil.

The weight, and consequently the value of diamonds, is estimated in carats, one of which is equal to four grains; and the price of one diamond, compared to that of another of equal color, transparency, purity, form, &c. is as the squares of the respective weights. The average price of rough diamonds that are worth working, is about L. 2 for the first carat. The value of a cut diamond being equal to that of a rough diamond of double weight, exclusive of the price of workmanship, the cost of a rough diamond of

1 carat is			L. 8
2 do	is the square of	2 X L. 8,=	32
3 do	is the square of	3 X L. 8,=	72
4 do	is the square of	4 X L. 8,=	128
100 do	is the square of	100 2 X L. 8,=	8000

This rule, however, is not extended to diamonds of more than 20 carats. The larger ones are disposed of at prices inferior to their value by that computation. The snow-white diamond is most highly prized by the jeweller. If transparent and pure, it is said to be of the first water.

Diamond, *brilliant*, is that which is cut in faces both at top and bottom; and whose table, or principal face at top is flat.

Diamond, *rose*, is one that is quite flat underneath, with its upper part cut in many little faces, usually triangles, the uppermost of which terminate in a point. In rose diamonds the depth of the stone from the base to the point must be half the breadth of the diameter of the base of the stone.

The largest diamond ever known in the world is one belonging to the king of Portugal, which was found in Brazil. It is still uncut; and Mr. Magellan informs us that it was of a larger size; but a piece was cleaved or broken off by the ignorant countryman who chanced to find this great gem, and tried its hardness by the stroke of a large hammer upon the anvil. This prodigious diamond weighs 1680 carats; and though uncut, Mr. Rome de L'isle says that it is valued at 224 millions sterling; which gives the estimation of 79. 36, or about 80 pounds sterling for each carat, viz. for the multiplicand of the square of its whole weight. The famous diamond in the sceptre of the emperor of Russia, weighs 779 carats, and is worth at least 4,854,723 pounds sterling, although it hardly cost 135,417 guineas. This diamond originally was one of the eyes of a Malabaric idol named Scheringham; and a French grenadier, who had deserted from the Indian service, contrived to become one of the priests of that idol, and by that means to steal it. After passing through several hands, the late Prince Orloff purchased it at Amsterdam in 1766, for his sovereign the empress of Russia. The diamond of the Great Mogul is cut in rose, weighs 279 9-16 carats, and is worth 380,000 guineas, though it has a small flaw near the bottom.

QUESTIONS ON LYCEUM No. 9.

In what year was Ferguson, the Astronomer, born?

What was the employment of his father?

Were books agreeable or irksome to James when a child?

What incident first led Ferguson to experiment in philosophy?

How did he learn the structure of a watch?

What two parts of Indian corn are necessary to produce fruit?

What is the cause of red kernels on different ears in various parts of a field of corn?

Why do not the seeds of apples always produce the same kind of tree as that on which they grow?

Which is the most abundant ingredient in Indian corn, starch or gluten?

Which part of corn contains the most sugar, the grain or stalk?

Which plant is most extensively cultivated in America, Indian corn or the potato?

What are some of the uses to which Indian corn is applied?

What two measures are capable of placing Lyceums on a permanent foundation?

What accommodations are necessary to enable a circuit teacher to render his instructions in the highest degree useful?

Which would give a young lady or gentleman the best education, the advantage of a Lyceum one half day in a week for ten years, or attending an academy the whole time for two years, and which would be most expensive?

How many shares, at twenty-five dollars each, would be necessary to erect a commodious Lyceum?

What classes of the community might be accommodated at a town or village Lyceum?

What is the color of hornblende, and what rocks are partially or principally composed of it?

Which rock contains the largest proportion of hornblende, sienite or greenstone?

What metal does hornblende contain in large quantities?

Are hornblende rocks heavy or light?

What places furnish proof of the neglect of letter-writing in our system of education?

On what subject would a circuit school afford the most useful instruction in two or three hours, letter-writing or grammar?

Which is the most common fault in folding letters, making them too large, or too small?

How many could receive instruction at a Lyceum at the same time on the mechanical part of letter-writing?

Is it common or rare for Indians to quarrel with their wives?

In what part of the country can circuit schools be established with greatest ease, in New England or the Western States, and where are they most necessary?

Are earthen vessels of ancient or modern origin?

Were bricks made by the Romans more or less perfect than ours?

What nation introduced porcelain into Europe?

At what time was the Chinese art of making porcelain first obtained from them, and who obtained it?

What is a gem; and what are the colors and names of some of the principal ones?

What are the names of some of the yellow gems? also of the blue and green?

Which is hardest, felspar or quartz?